What do these items have in common?

MILK

Protein, fat globules dispersed in liquid

SMOKE

Solid soot particles dispersed in a fluid

GELATIN

Water dispersed in a protein medium


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Examples |

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Shaving Cream
Gas droplets within a liquid

Aerogel
Solid with air pockets dispersed

Blood
Cells dispersed in plasma

Colloidal Silica
Silica dispersed in water

4

3

2

1

Colloids

Presentation by Sharon Park

4

3

2

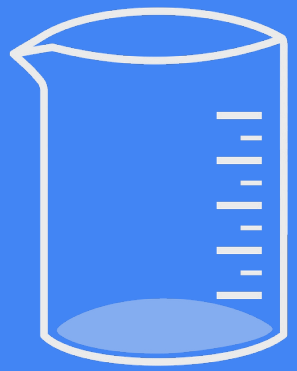
1

01

PROPERTIES

What are colloids?

What are their properties?



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2

1

02

HISTORY

When were colloids discovered?

Which scientists made the discoveries?

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03

CLASSIFICATIONS

What are the different types of colloids?

How are they distinguished?

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04

APPLICATIONS

What applications are colloids used for?

How are they used in these applications?

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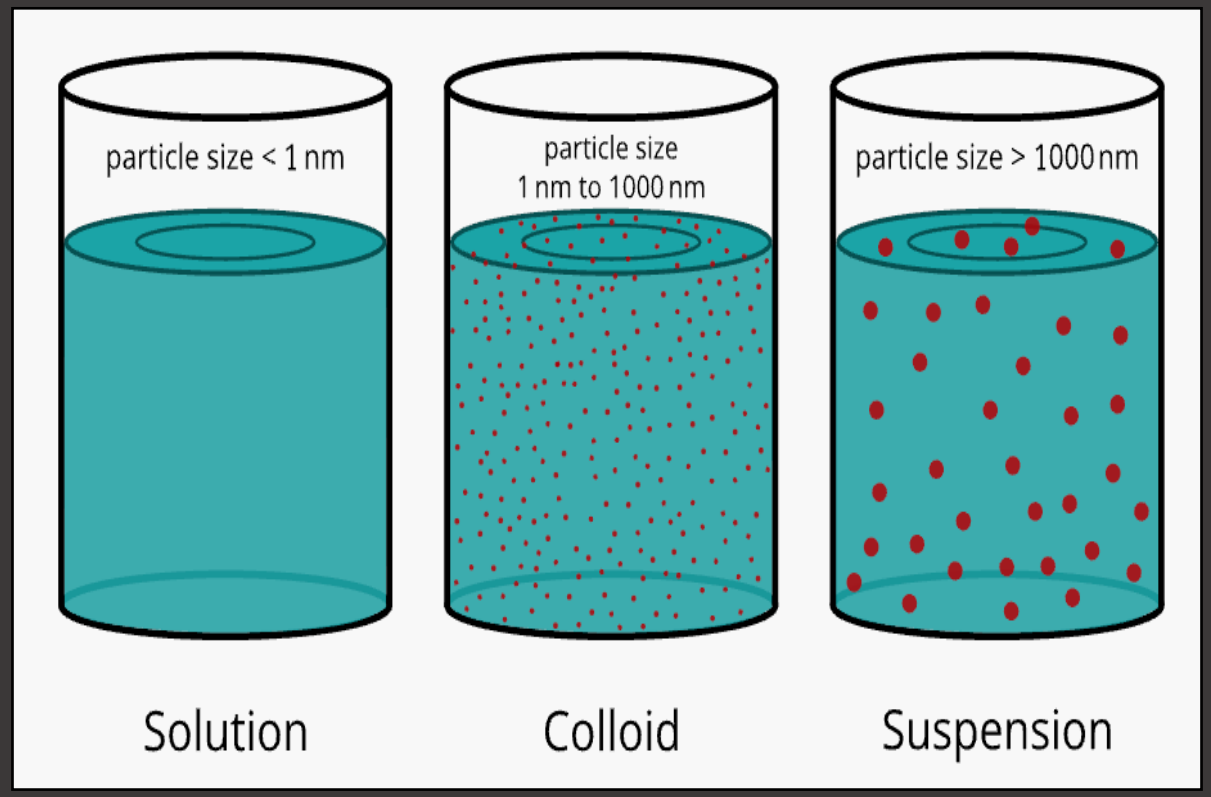
Showing results for *Properties of Colloids*

A colloid is a substance of two phases, a dispersed phase, containing small particles and a continuous phase, i.e., dispersion medium.

New World Encyclopedia

Others want to know

- Colloids are heterogeneous mixtures
- Particle sizes are 1 nm – 1 μm in diameter
- Four types of interactions between particles
- Kinetical and thermodynamical stability
- Physical: size and shape of particles
- Surface: wettability and charge of surface



How Colloids differ from Solutions & Suspensions

A colloid is an intermediate between solutions and suspensions. Colloids exhibit the Tyndall Effect by scattering the passing light through the medium. This doesn't occur in solutions or suspensions.

Colloids Properties | Back to results

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A colloid is a substance of two phases, a dispersed phase, containing small particles and a continuous phase, i.e., dispersion medium.

New World Encyclopedia

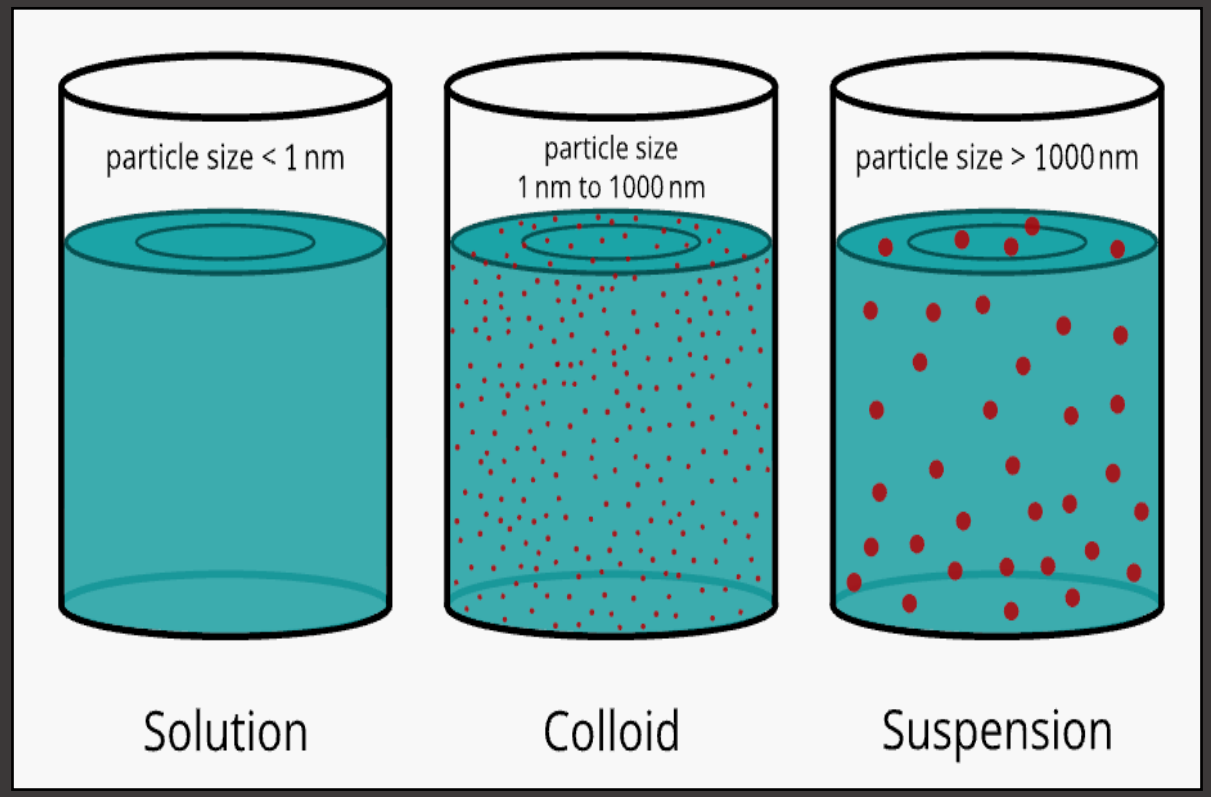
Others want to know

Colloids are heterogeneous mixtures

Particle sizes are 1 nm – 1 μm in diameter

Four types of interactions between particles

1. Electrostatic interactions
2. van der Waals interactions
3. Entropic forces
4. Steric forces



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New World Encyclopedia

Others want to know

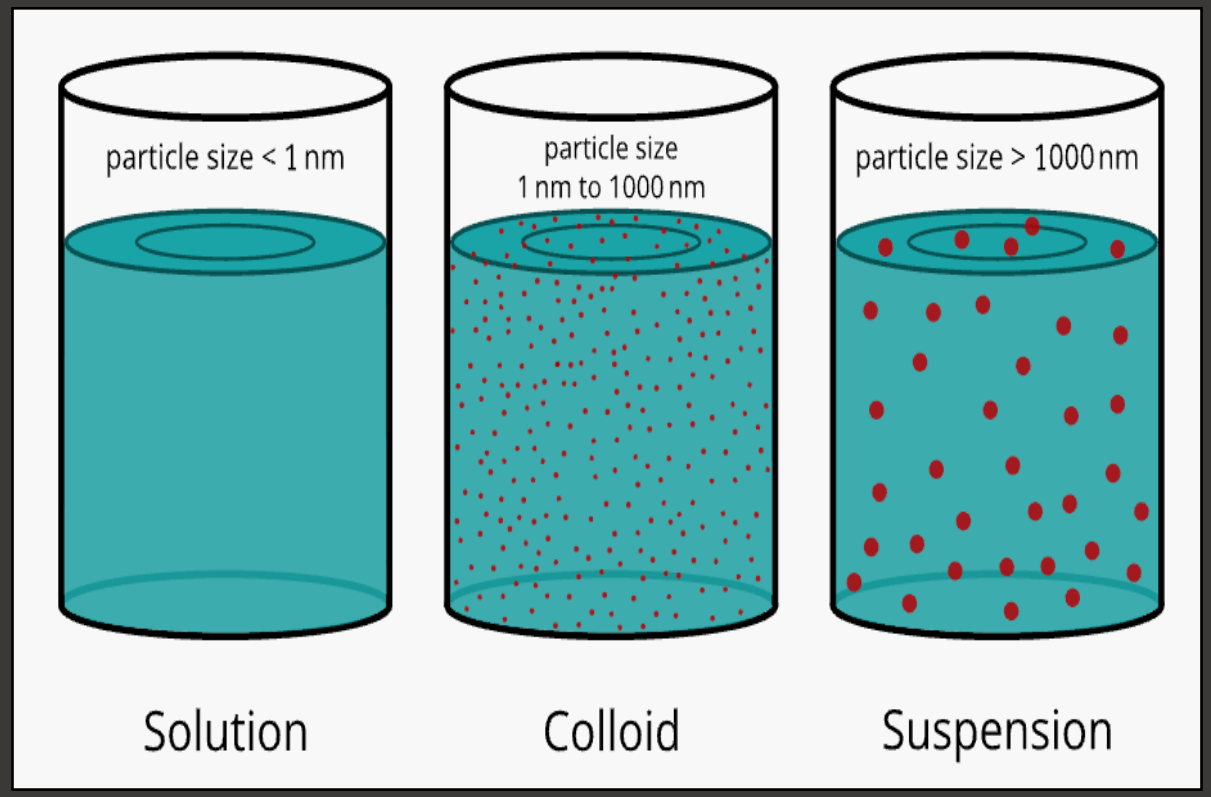
Colloids are heterogeneous mixtures

Particle sizes are 1 nm – 1 μm in diameter

Four types of interactions between particles

Kinetical and thermodynamical stability

1. Energy barrier to particle aggregation
2. $G_{\text{aggregated particle}} > G_{\text{dispersed particle}}$



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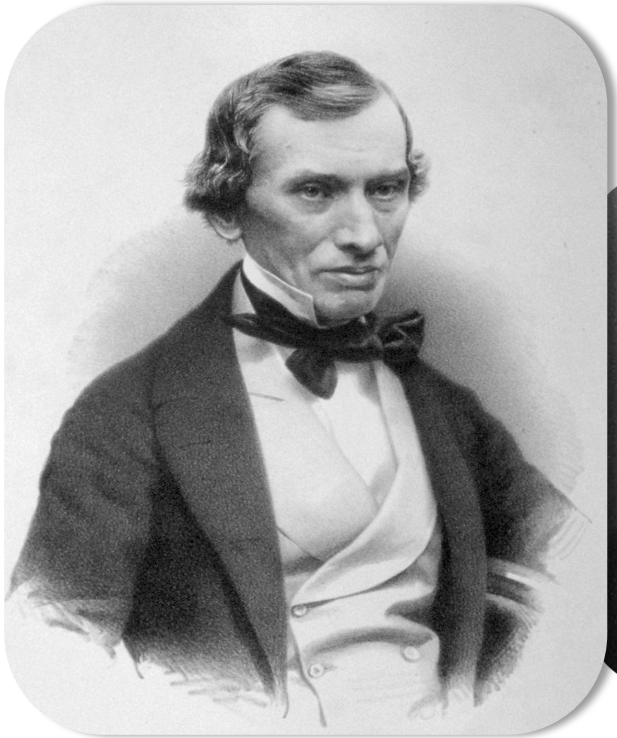
Showing results for *Scientists who made important discoveries in Colloids*

Colloids the Movie / **Cast**



Thomas Graham
Scottish Chemist




(**1805** – **1869**) | Considered the father of colloidal chemistry. He was the first to coin the term "colloid" in reference to substances that were in intermediate size between molecules and particles visible to the naked eye. Graham also developed methods for the identification of colloids and studied their properties and behavior.

Colloids History

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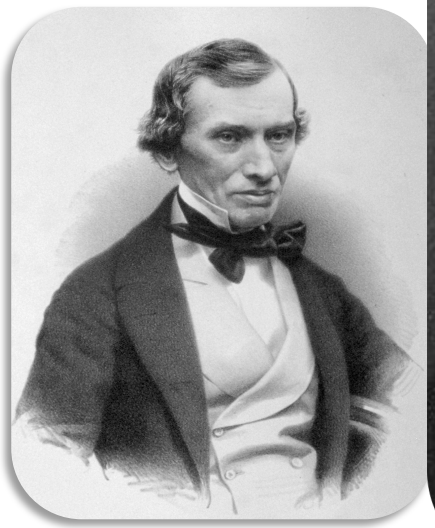

Friedrich Reinitzer
Austrian Chemist

(**1857** – **1927**) | Discovered liquid crystals. He observed that certain substances had a melting point that was lower than their freezing point, and that they exhibited a range of different phases. Reinitzer's work on liquid crystals helped to lay the foundation for our modern understanding of colloids, and their physical properties.

Colloids History

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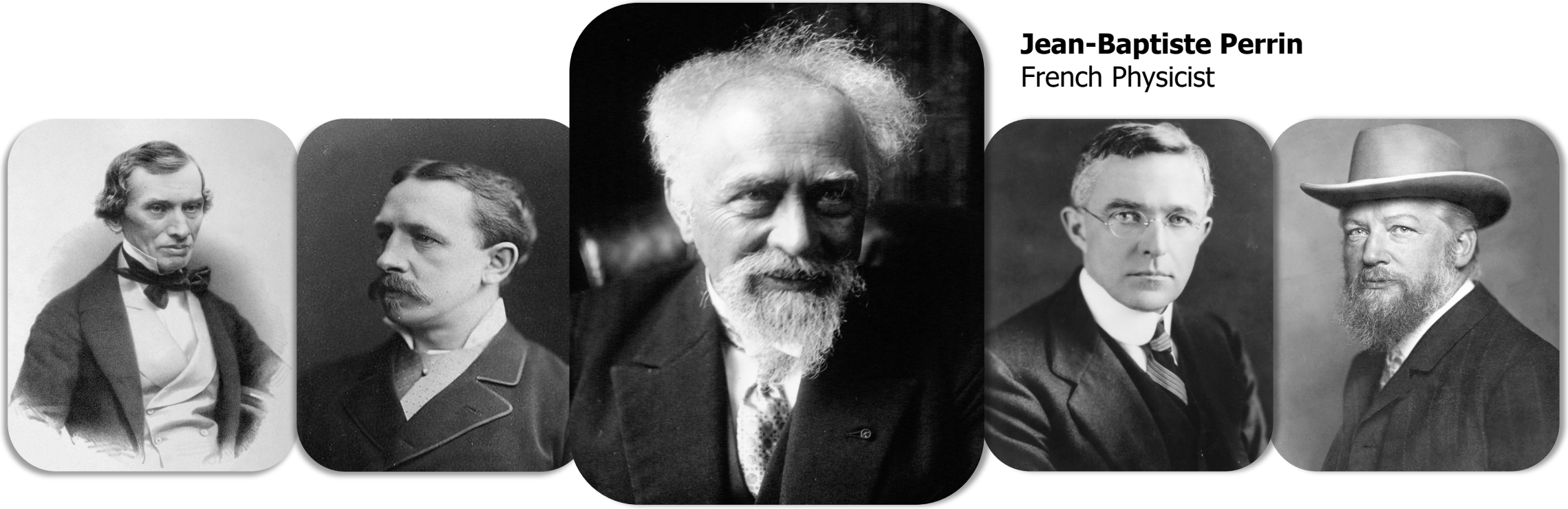

Jean-Baptiste Perrin
French Physicist

(**1870** – **1942**) | Known for his work on the Brownian motion of particles. He conducted experiments that demonstrated the random motion of particles in a fluid and showed how this motion could be used to determine the size and mass of particles. His work helped confirm the existence of atoms and molecules and led to a better understanding of the behavior of colloids.

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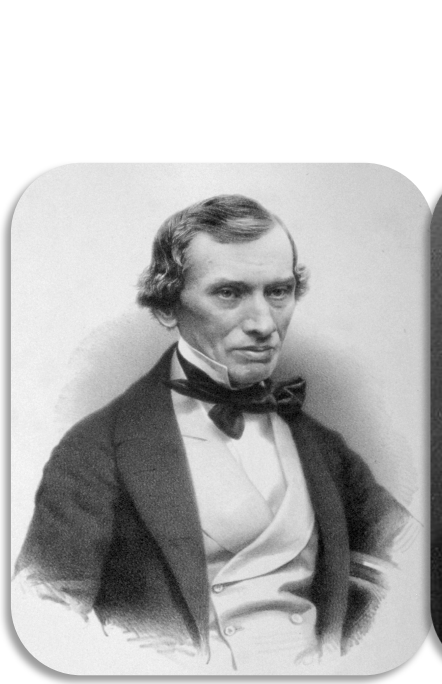


Irving Langmuir
American Chemist

(**1881** – **1957**) | Known for his work on surface chemistry. He studied the behavior of molecules and atoms at the surface of liquids and solids and developed the concept of the "monolayer" to describe the organization of molecules at the surfaces. Langmuir's work helped to explain the properties of colloids and paved the way for the development of new materials and technologies.

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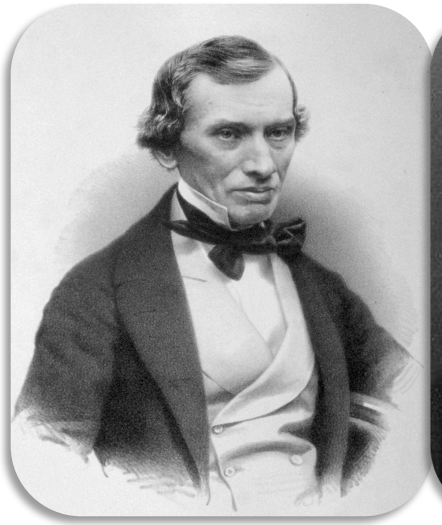
Wolfgang Ostwald
German Chemist





(**1883** – **1943**) | Known for his work on the properties and behavior of colloids. He developed the concept of "Ostwald ripening" to explain the growth and dissolution of colloidal particles and studied the effects of pH and other factors on the stability of colloids. Ostwald's work helped to establish the principles of colloid chemistry and led to many practical applications in many fields.

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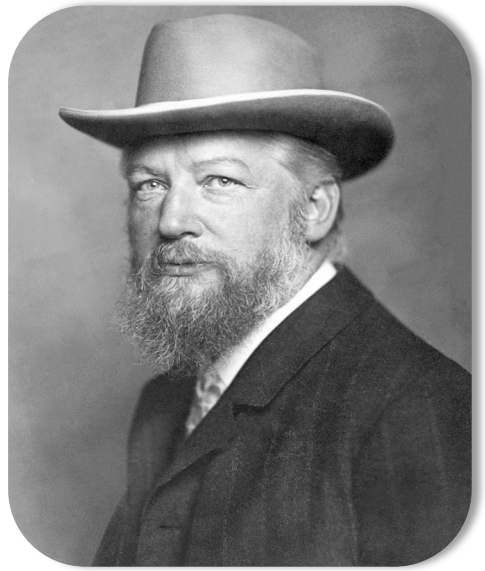

Wolfgang Ostwald
German Chemist

The scientists who contributed to the discovery and establishment of colloid chemistry. Their work has led to many important discoveries and applications affecting fields from medicine to engineering.

Colloids

Classifications

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A1 fx **Dispersed Phase**

Dispersion Medium	Gas	Liquid	Solid
Gas	NONE	LIQUID AEROSOL	SOLID AEROSOL
Liquid	FOAM	EMULSION	SOL
Solid	SOLID FOAM	GEL	SOLID-SOL

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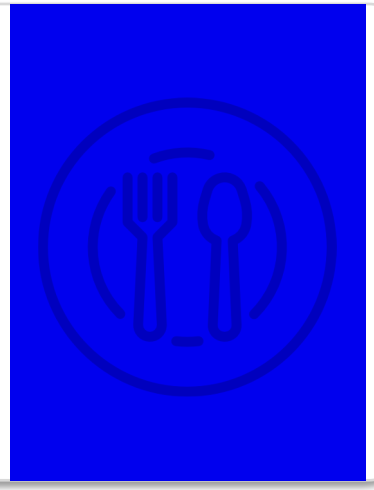
Colloids > **Applications to almost every industry!**

Food Industry

Many foods are by nature colloids, in other cases, they are used to improve texture, appearance and stability of food products.

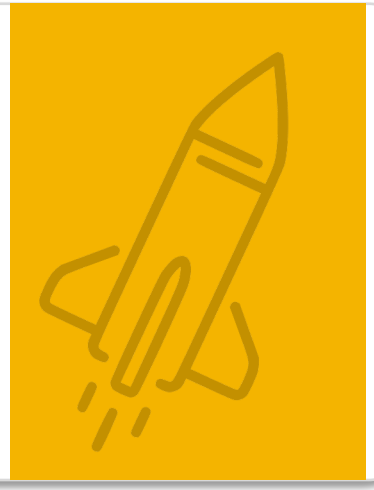


Medical Industry

Valuable tools used to aid drug delivery systems, medical imaging, wound healing, fluid replacement therapies, to name a few.

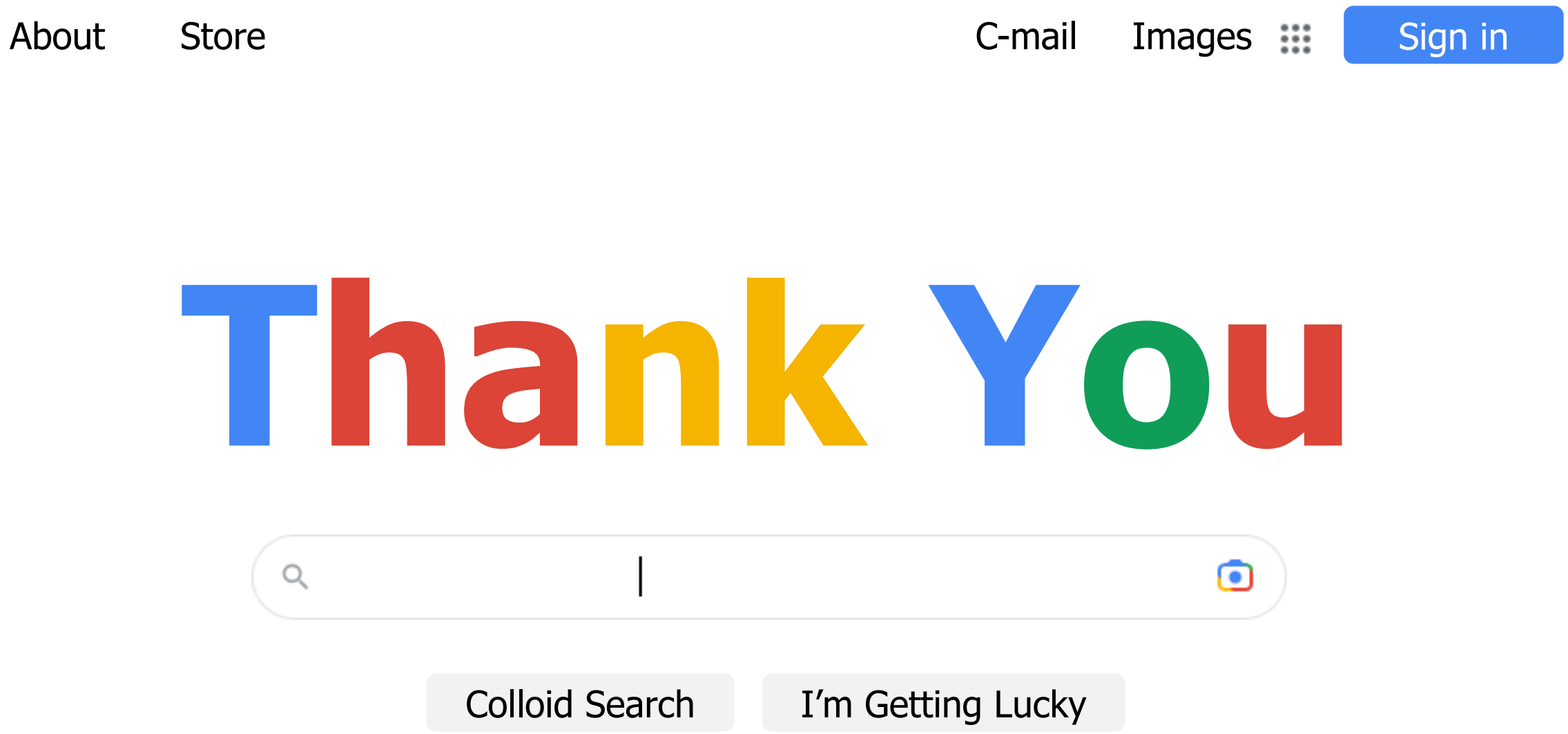
Defense Industry

Used in the development of camouflage materials, explosives, propellants, barrier coatings for aircraft and weapons systems.



Research Industry

Prolific uses in cases like metal sample preparation, development of new materials, biology, surface chemistry research, etc.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